Goddard Space Flight Center SPI

GSFC

GSFC Software Process Overview

Presented by: Ella Page

Software Process Improvement (SPI) Project

Purpose and Objectives

- **Purpose: Provide a walkthrough of top-priority Mission Software process assets**
- **Objective: Help you understand:**
  - **What's in a process description**
  - **How the process library is organized**
  - **What tasks are required for selected processes**
  - **Where to find support assets for each process addressed**
  - **Where to find assets in the Process Asset Library (PAL)**

http://software.gsfc.nasa.gov/process.cfm

Why This Process Overview?

- **To make teams aware of the defined processes**
  - **Although labeled "ISD" processes these have been elevated to applicability across all mission software projects**
- **To help teams understand where and how to find process assets**
- **To review the steps of key management processes**
  - **Project Planning**
  - **Project Monitoring and Control**
  - **Risk Management**
  - **Requirements Management**
  - **Configuration Management**
  - **Process and Product Quality Assurance**
  - **Software Acquisition (Supplier Agreement Management)**

Process Assets Reside on the Website

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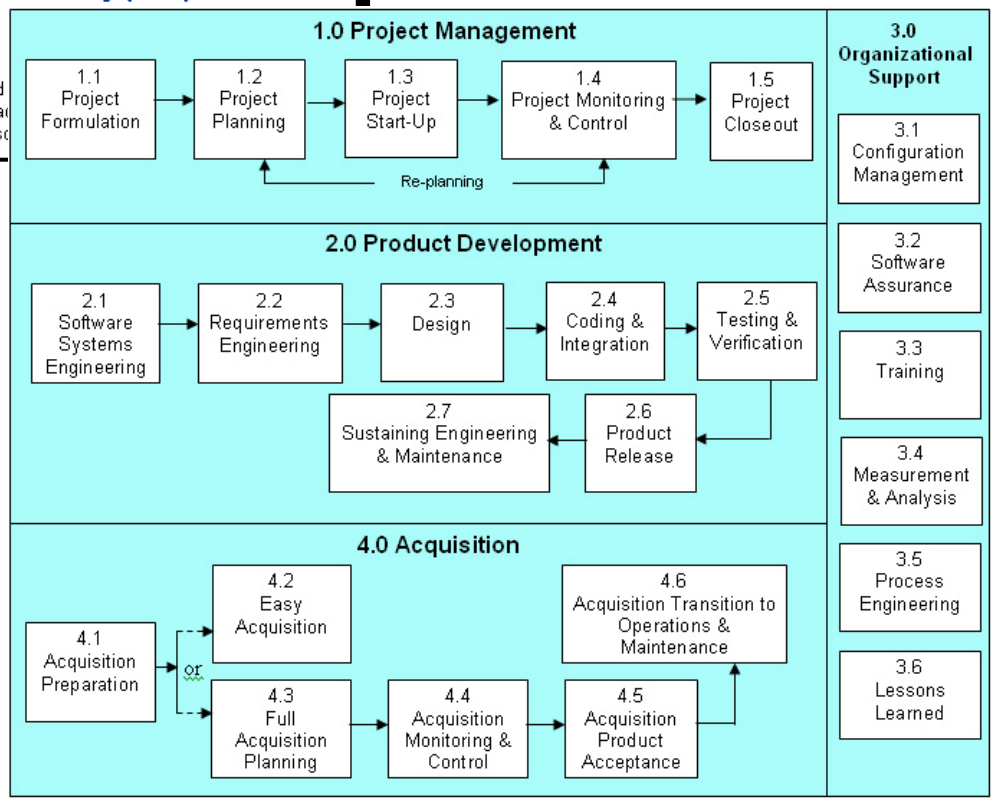
Go to http://software.gsfc.nasa.gov/process.cfm ...

then scroll down for the process hierarchy



Example –Project Management Assets

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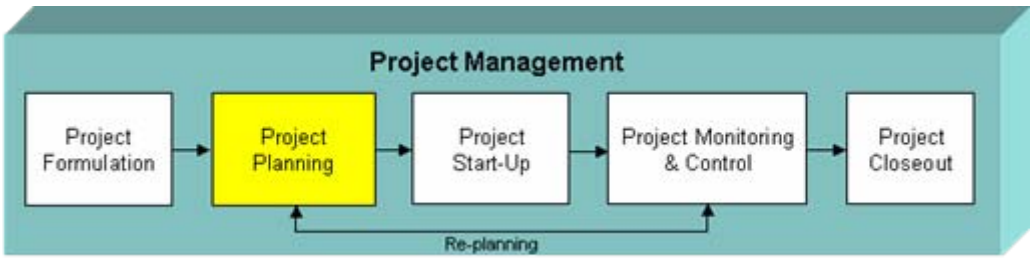
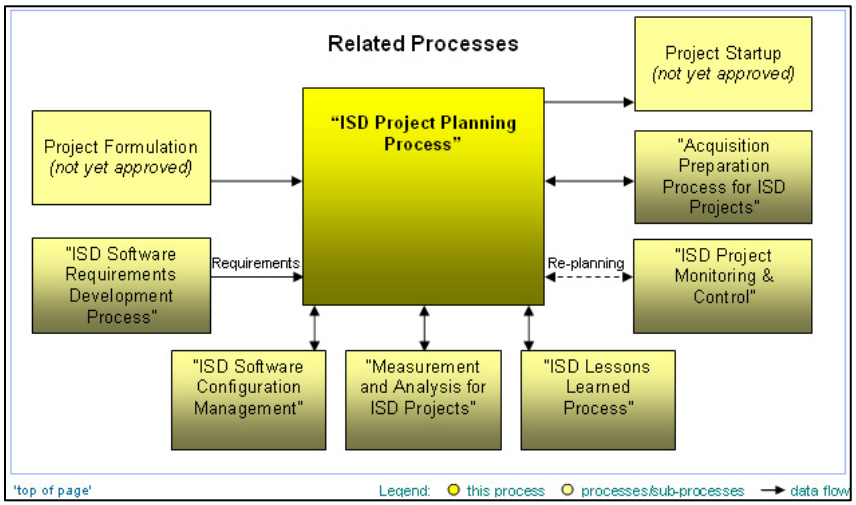
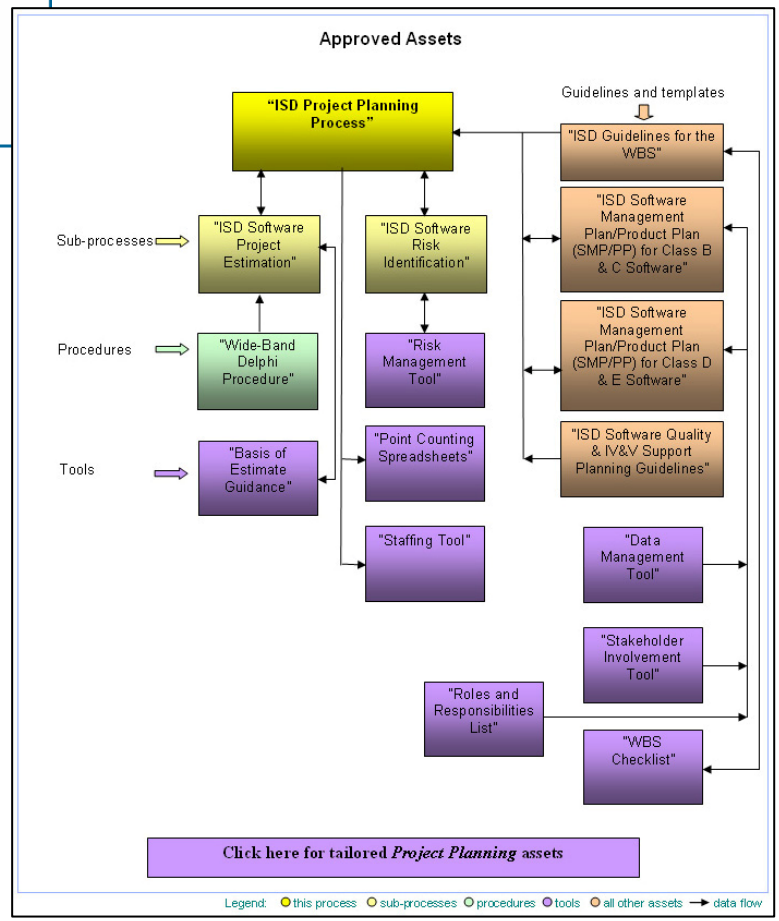
Category/Asset
- Project Management
  - Project Formulation
  - Project Planning
  - Project Startup
  - Project Monitoring and Control
  - Project Closeout

Project Planning is ... Planning the schedule, budget, staffing, and key activities of a project throughout its lifetime. Includes later re-planning in response to events such as new requirements or delayed hardware deliveries

Click here for Project Planning's :
1. Context Diagram.
2. Diagram of Approved Assets
3. Diagram of Related Processes.
4. Assets that remain to be developed.





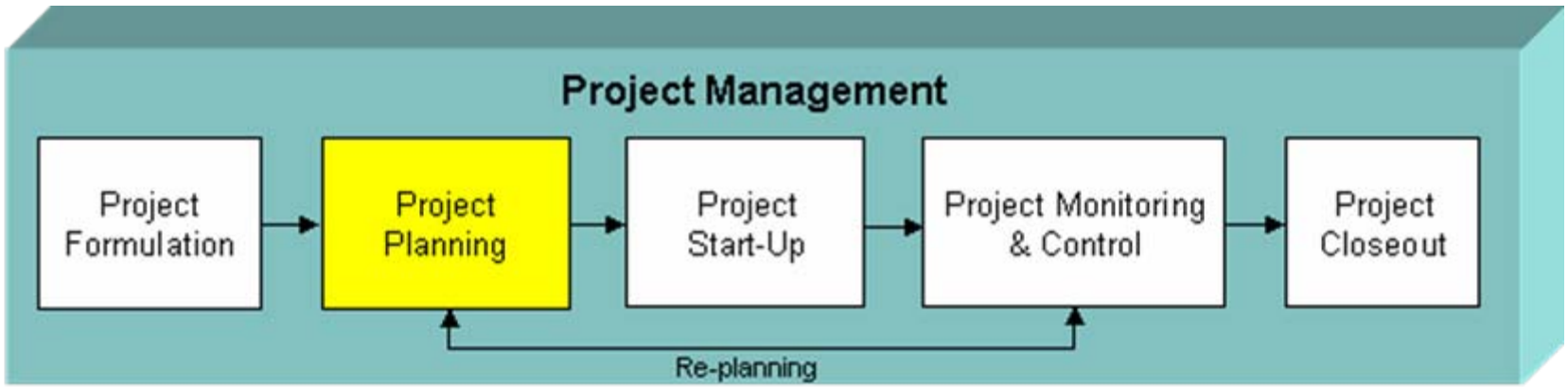


Process Description Content

- Purpose
- Scope
- Context
- Roles and Responsibilities
- Inputs
- Entry Scenarios
- Entry Criteria
- Exit Criteria
- Outputs
- *Major Task (list)*
- *Major Task Description*
- Measures
- Tools
- Training
- References
- QMS Records

Project Management - Project Planning Process

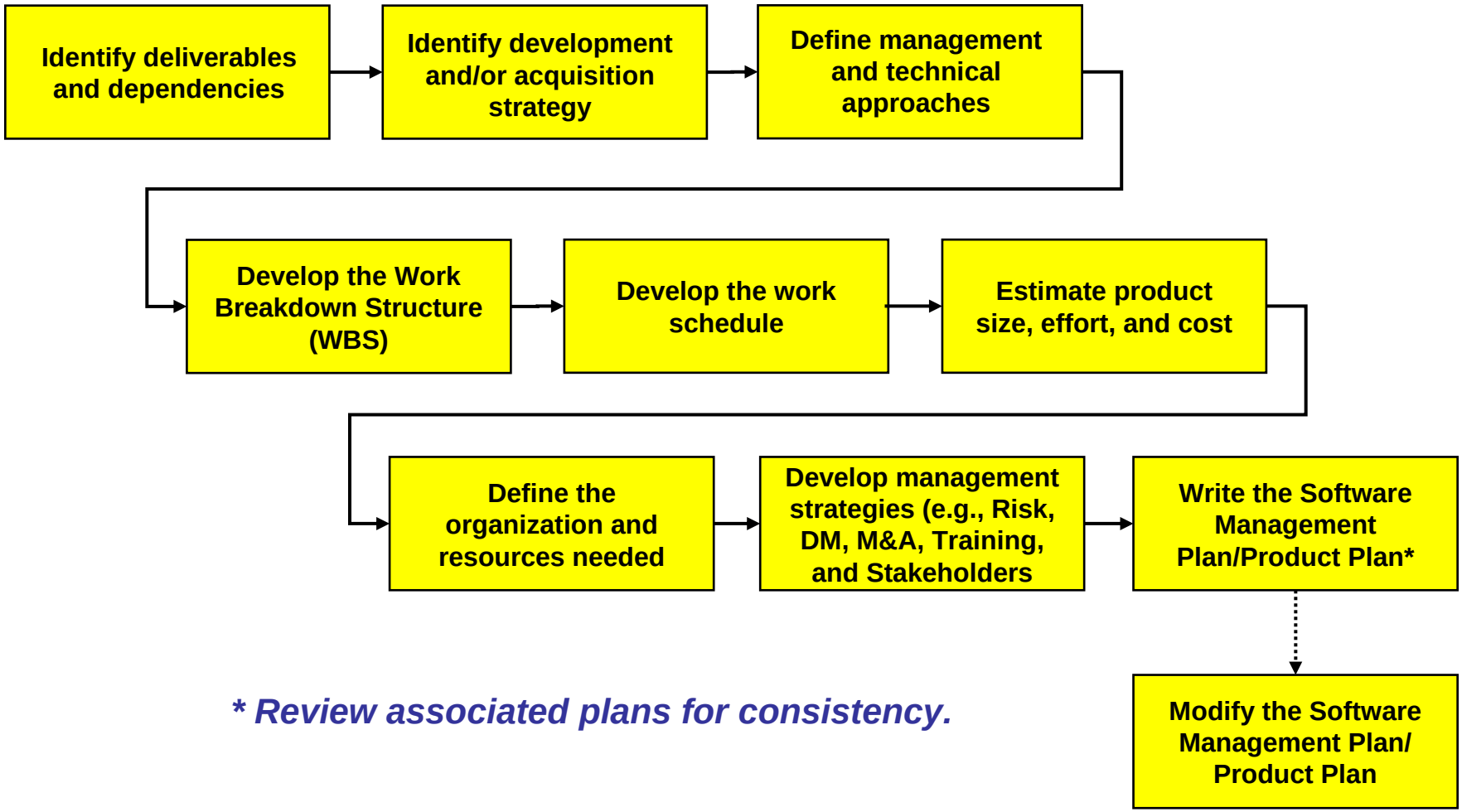
Helps you formulate your approach for managing and conducting your development or maintenance effort.



Planning the schedule, budget, staffing, and key activities of a project throughout its lifetime. Includes later re-planning in response to events such as new requirements or delayed hardware deliveries

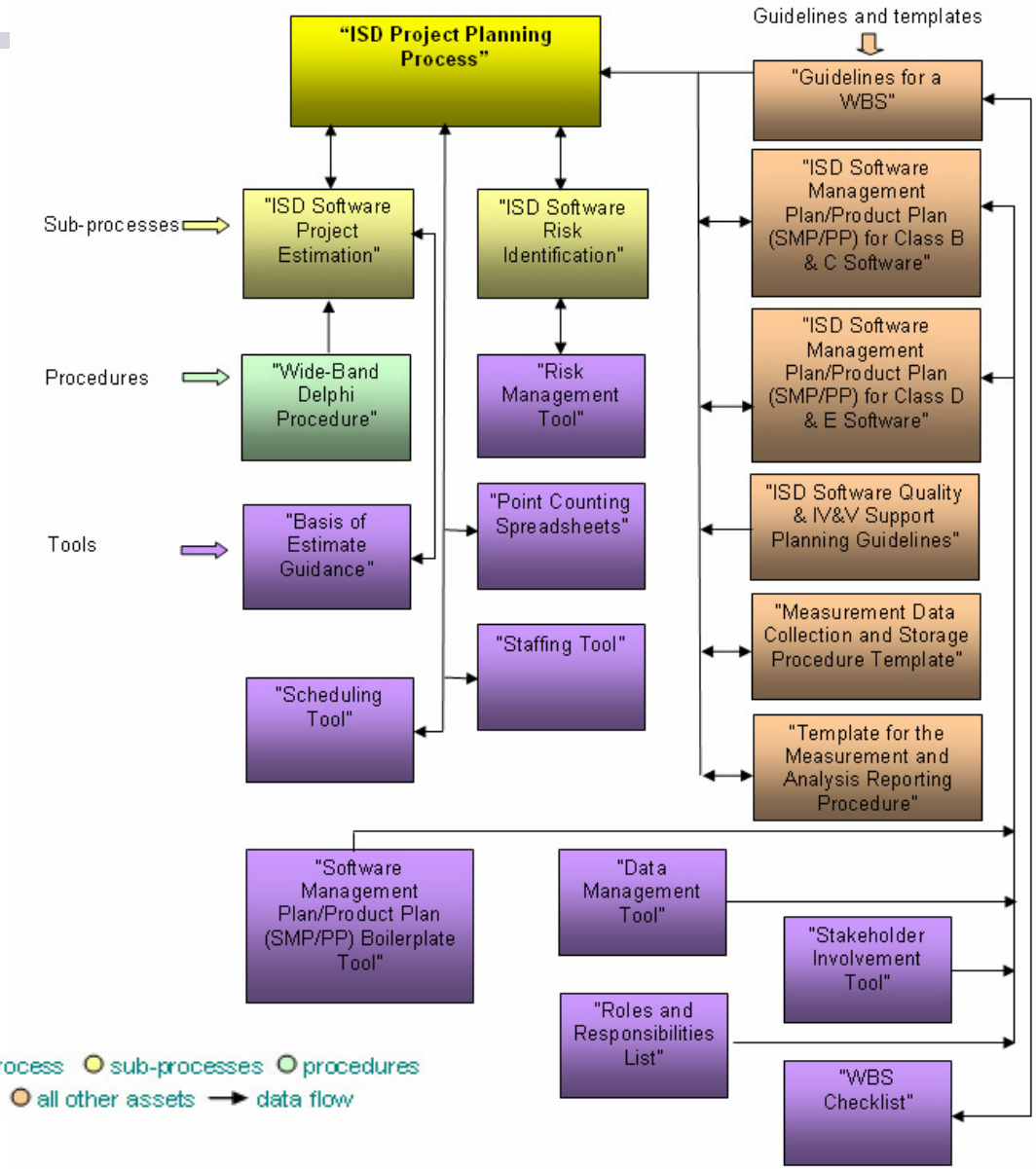
Project Planning Tasks

Tasks performed sequentially, iteratively, or in parallel



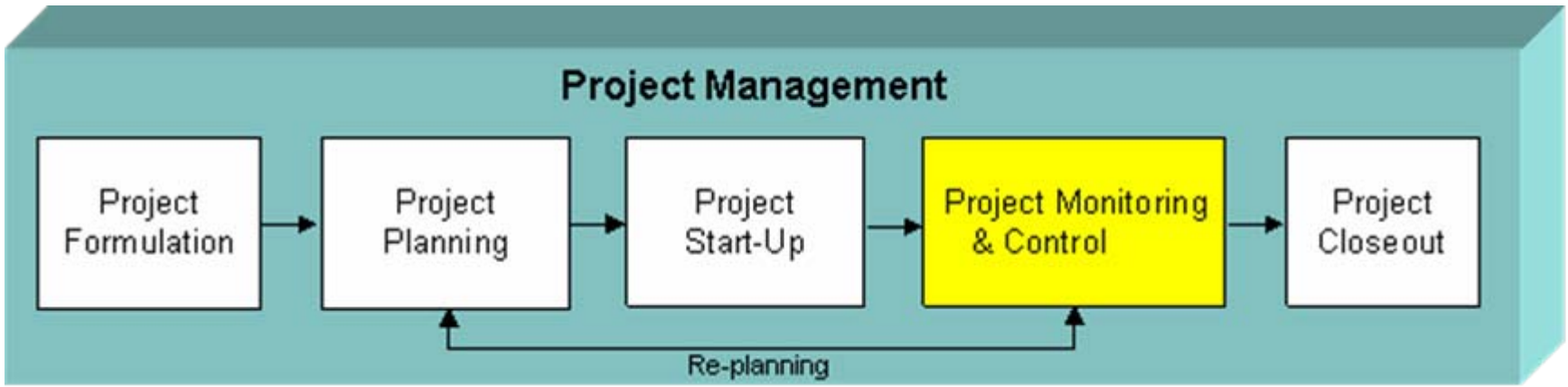
** Review associated plans for consistency.*

Project Planning – Related Assets



Project Management – Project Monitoring and Control Process

Shows you how to assess your project's progress so you can take corrective actions when performance deviates from your plan.



Tracking the performance of projects against the current management plans and controlling variances from the plan

Project Monitoring and Control Tasks

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Tasks performed continuously

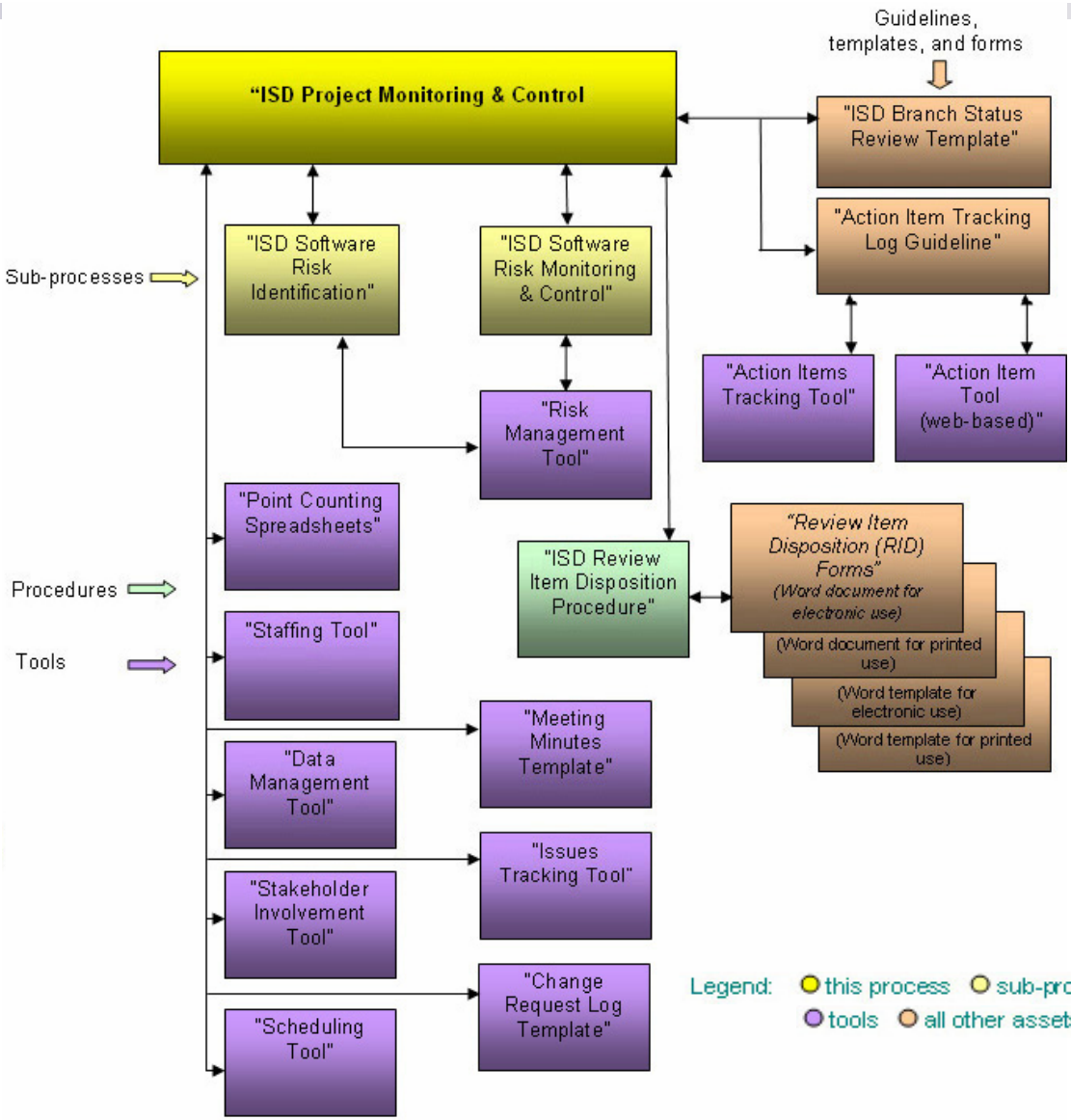
- Monitor software project activities and resources
- Monitor work products and project data*
- Monitor software acquisition
- Monitor commitments

**Monitoring includes data management, stakeholder involvement, training, and risk elements of the software project as you go.*

Tasks performed as needed

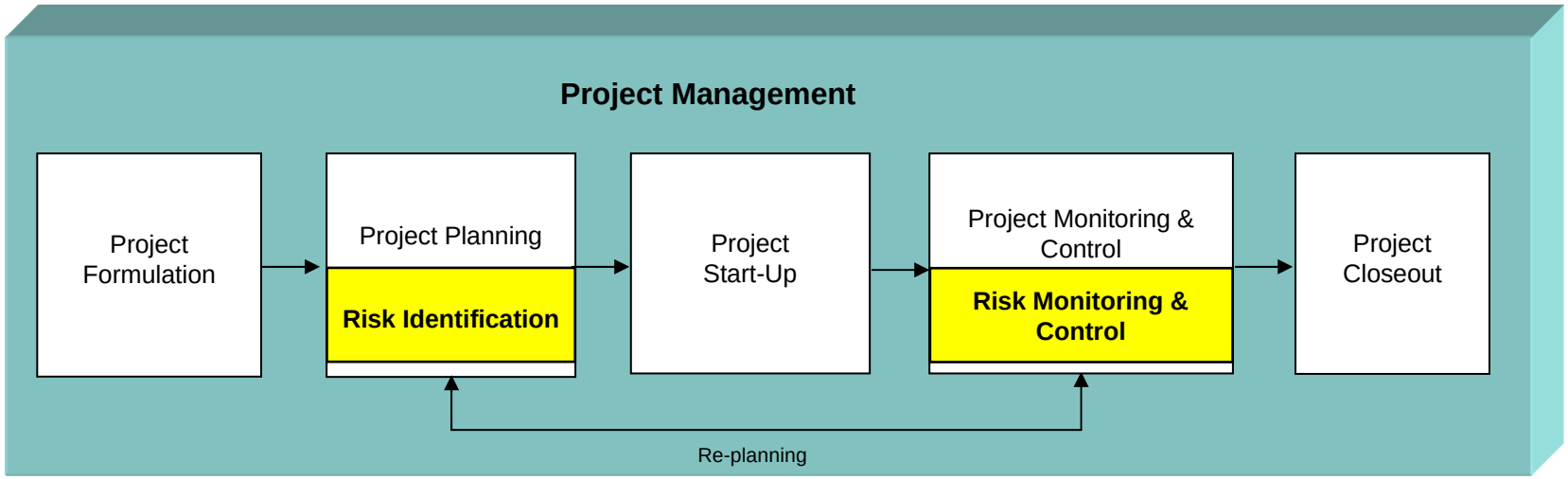
- Manage corrective actions
- Generate management reports and reviews
- Conduct milestone reviews
- Document lessons learned

Project Monitoring and Control – Related Assets



Project Management - Risk Management Process

Helps you minimize the impact of risks on cost, schedule, and quality of your software project products.



Identifying project areas of risk and then managing those risks to avoid or minimize impacts to the project

Risk Identification Tasks

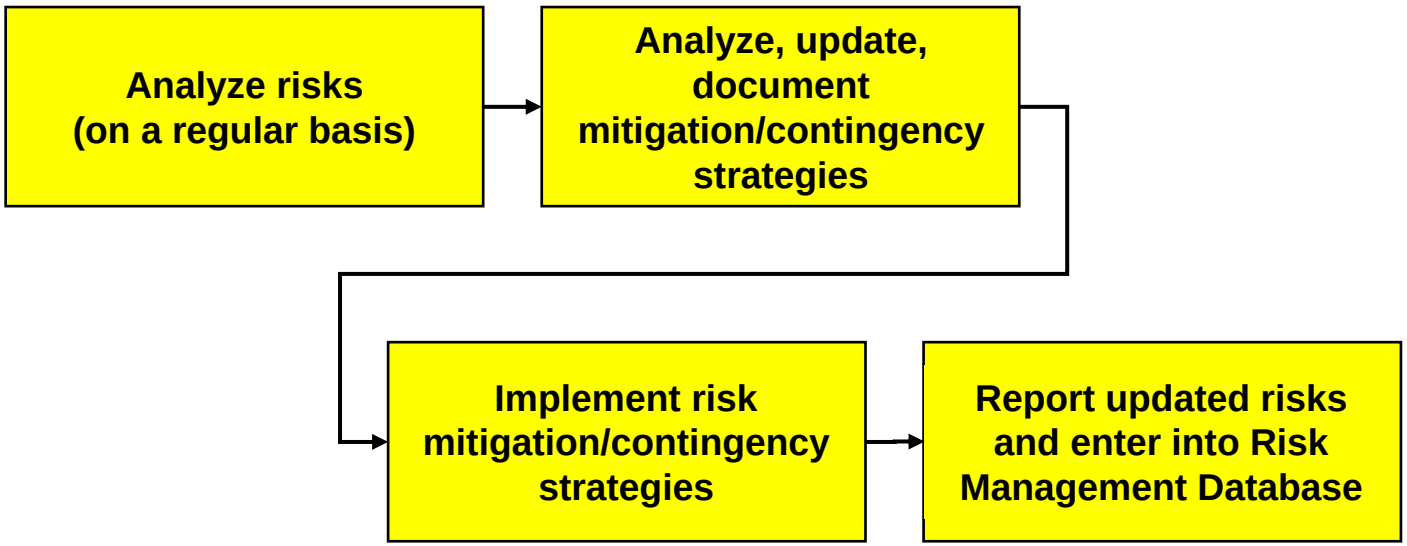
As you begin risk identification, establish a risk strategy* and identify risk sources and categories

**Risk strategy includes who will do it, the frequency of risk analysis, how risks will be elevated, and when mitigation plans are required*

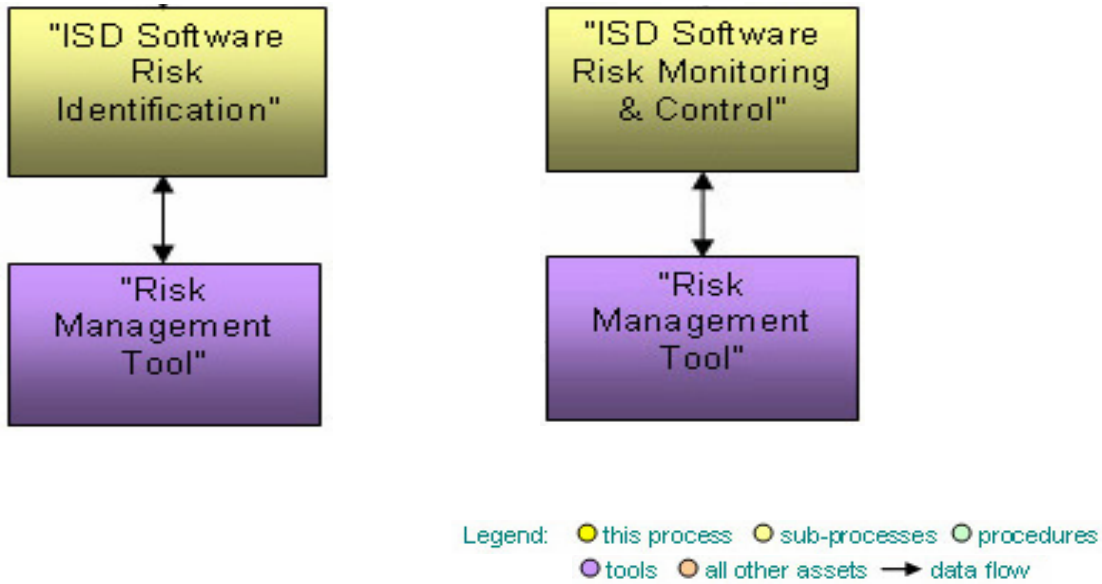
Tasks performed sequentially and iteratively

Risk Monitoring & Control Tasks

Tasks performed sequentially and iteratively

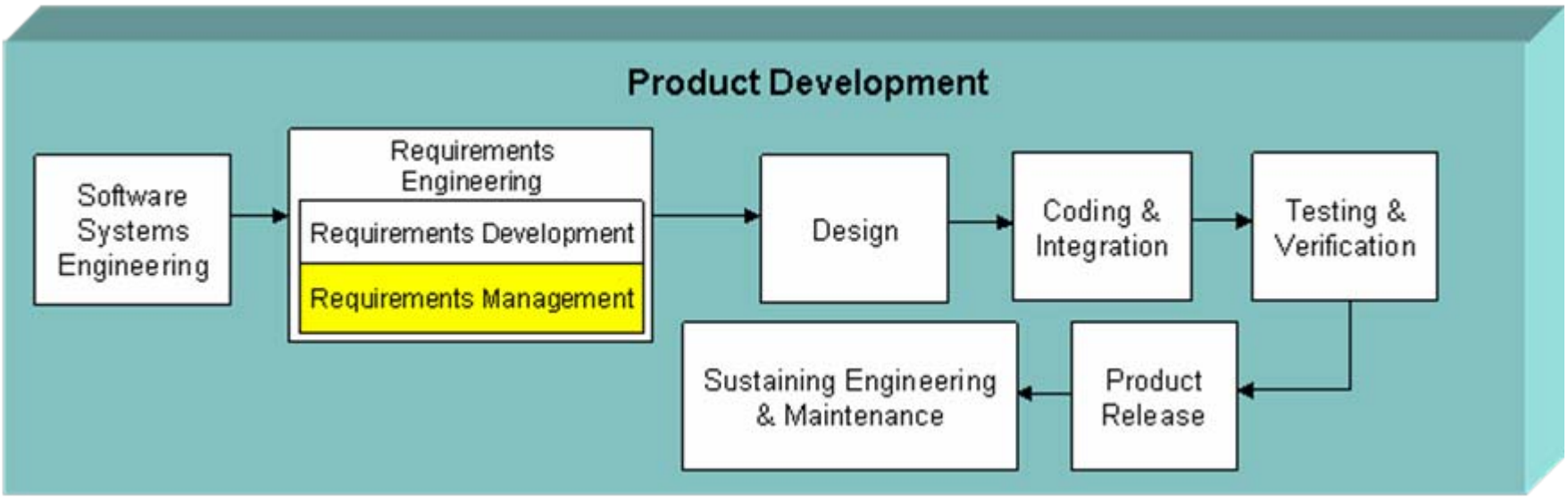


Risk Management – Related Assets



Product Development - Requirements Management Process

Keeps software project requirements change under control and lets you avoid unintended scope growth.



Managing changes to the requirement through understanding potential impacts of proposed changes and obtaining approval and resources for their implementation

Requirements Management Tasks

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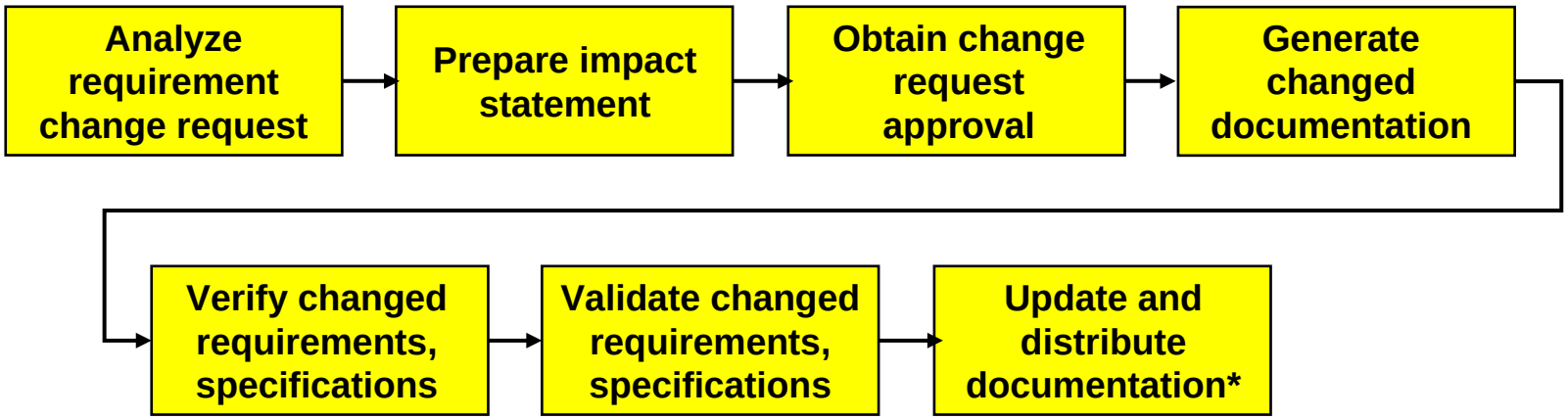
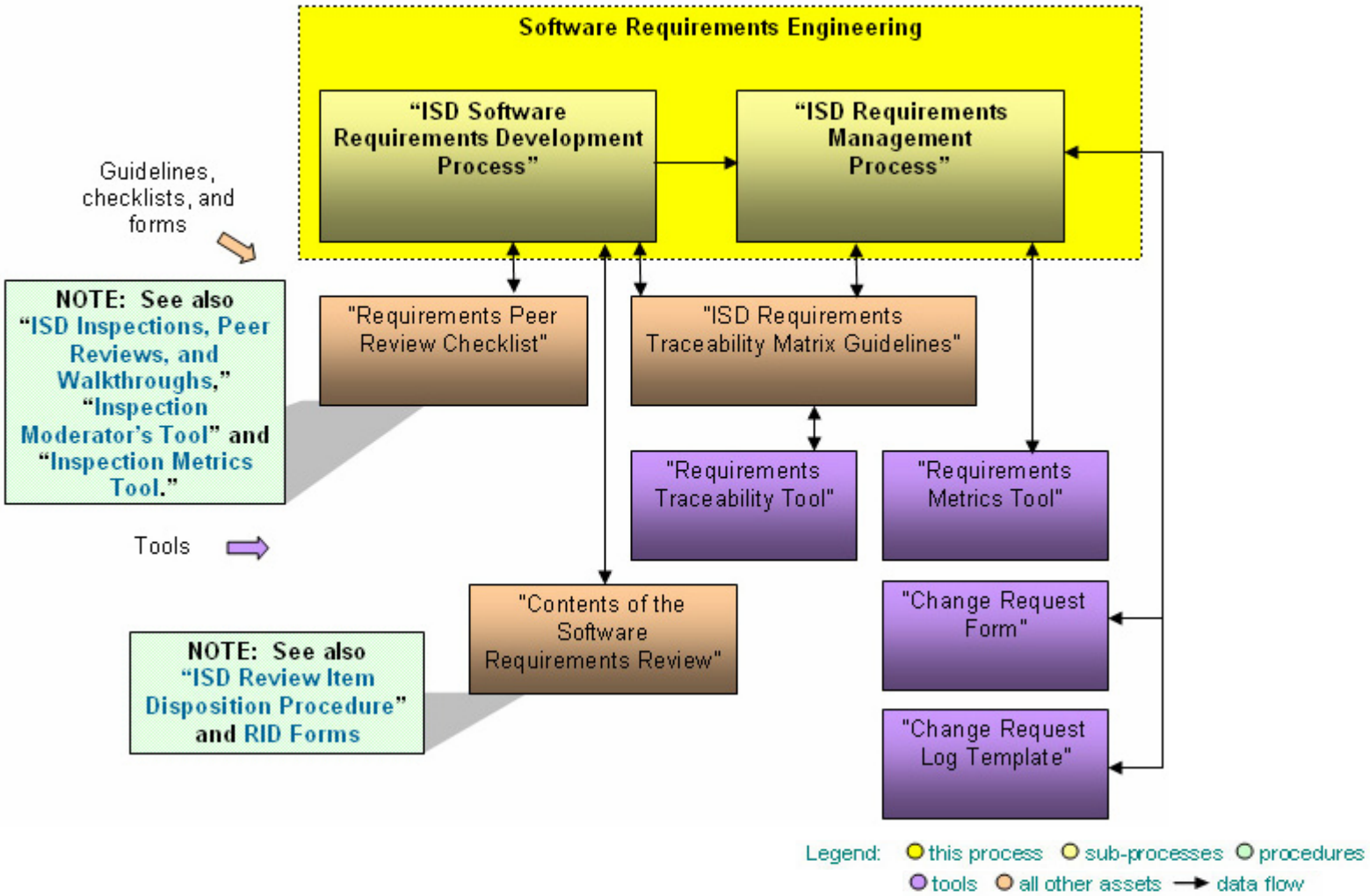
Tasks performed sequentially and iteratively



Don't forget to update the requirements traceability documentation

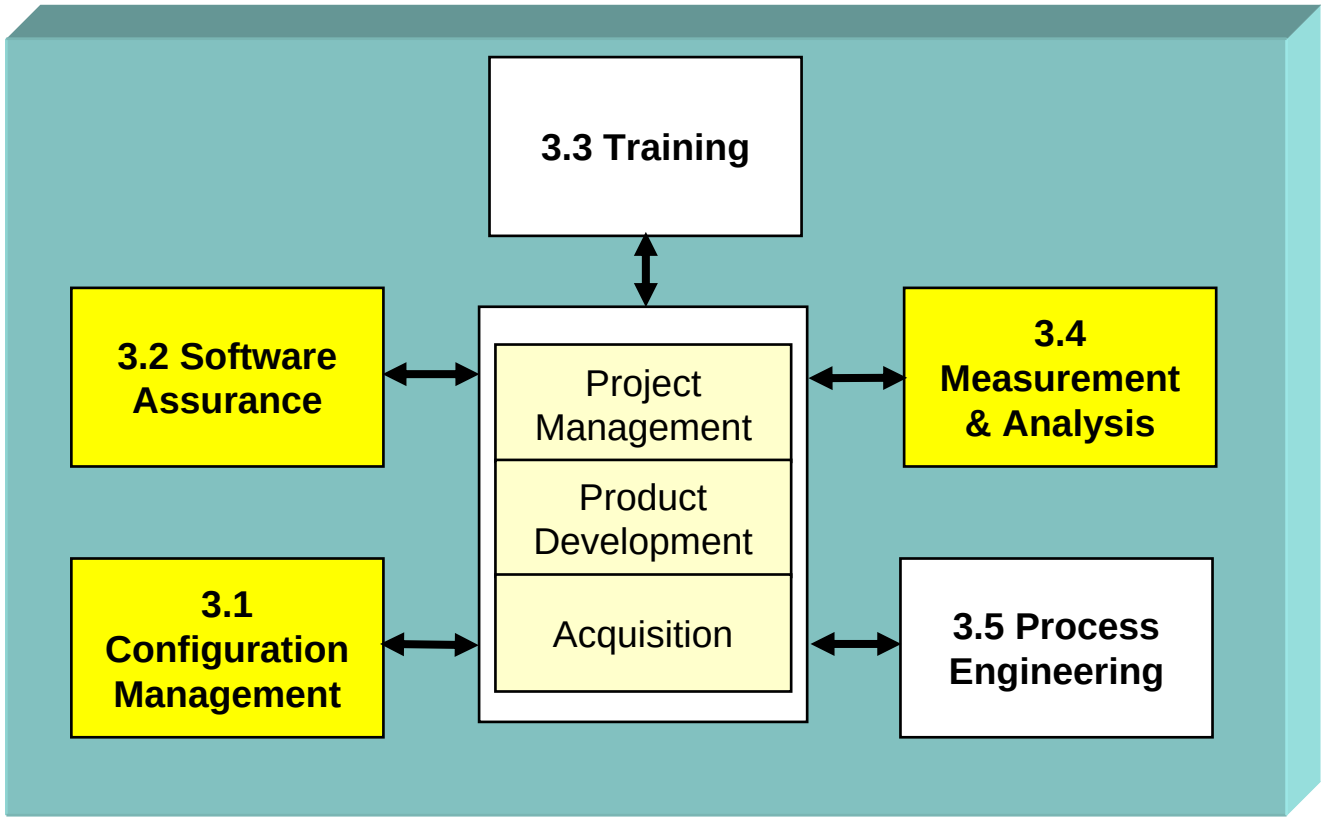
Requirements Management – Related Assets



Requirements Management – Example COTS Tools

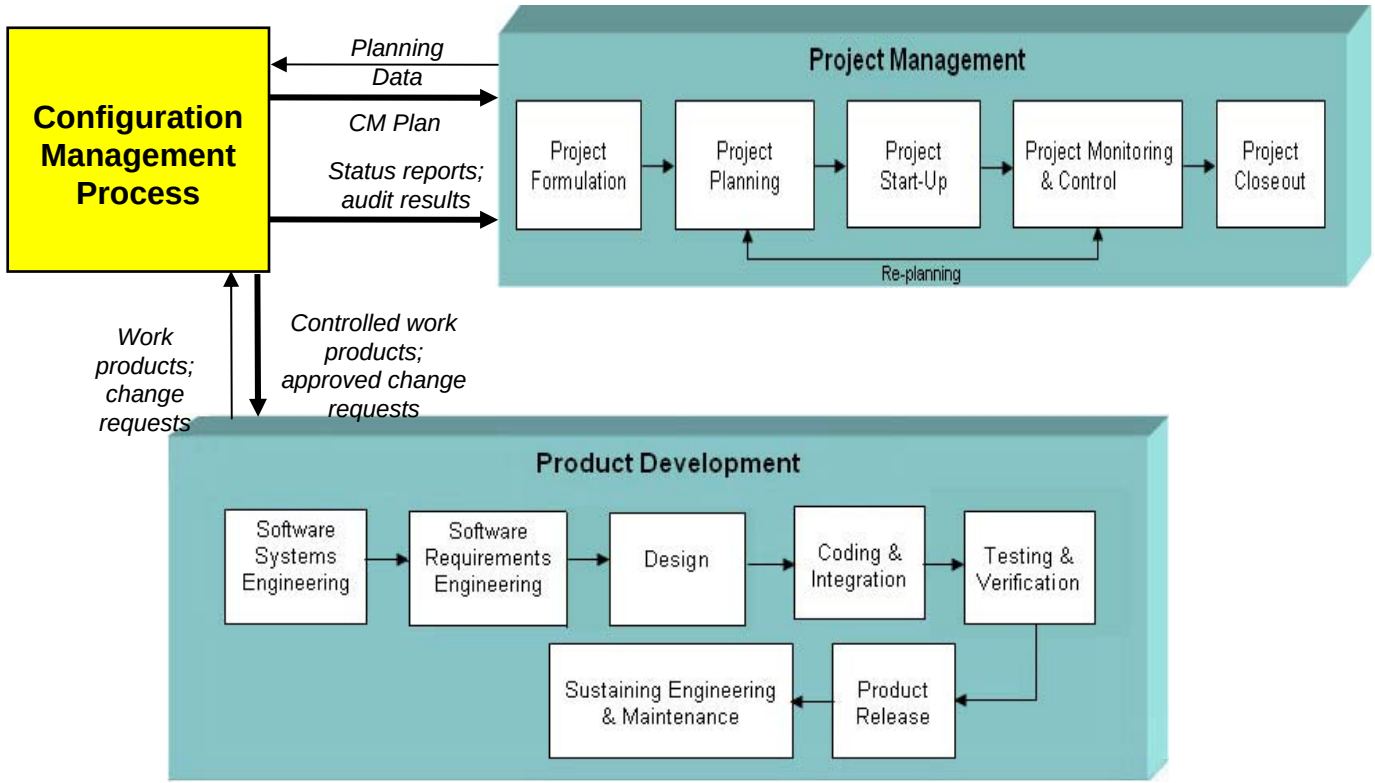
- **Rational RequisitePro – Requirements management aid:**
  http://www-306.ibm.com/software/awdtools/reqpro/
- **MKS – Requirements management tool:**
  http://www.mks.com/
- **DOORs – Requirements tracing aid:**
  http://www.telelogic.com/products/doorsers/doors/
- **SLATE – Requirements tracing aid:**
  http://www.sdrc.com/

Organizational Support - Relationship to Other Processes



Organizational Support - Configuration Management Process

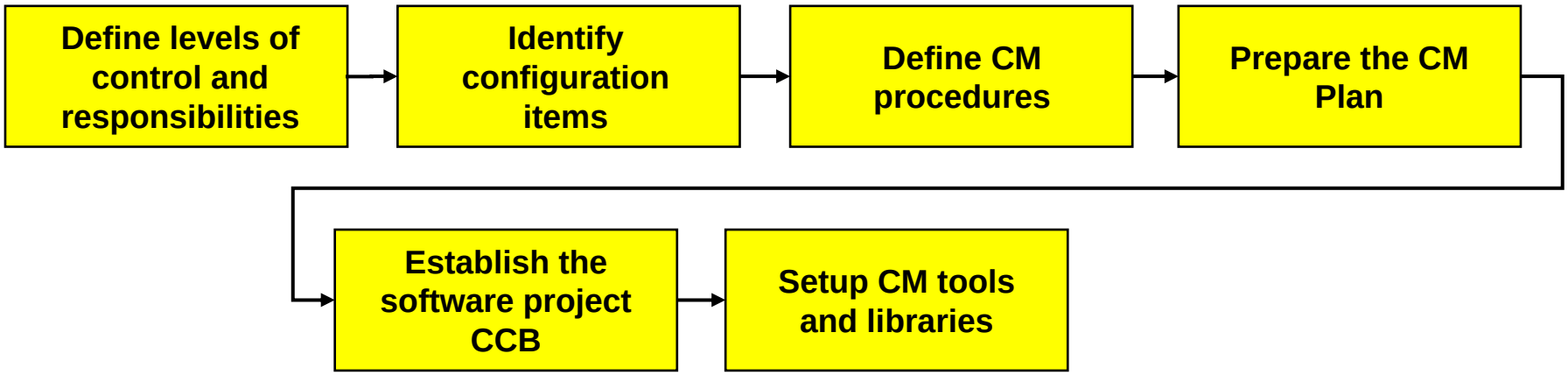
Helps you maintain the integrity of work products.



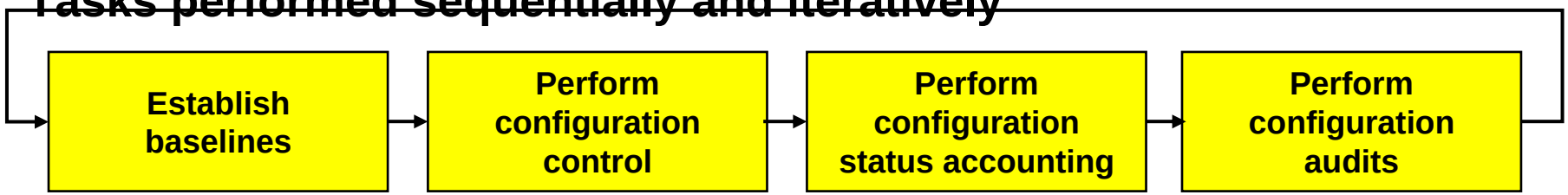
Maintaining the integrity of the system as it is under development using requirements control, change control, and version control

Configuration Management Tasks

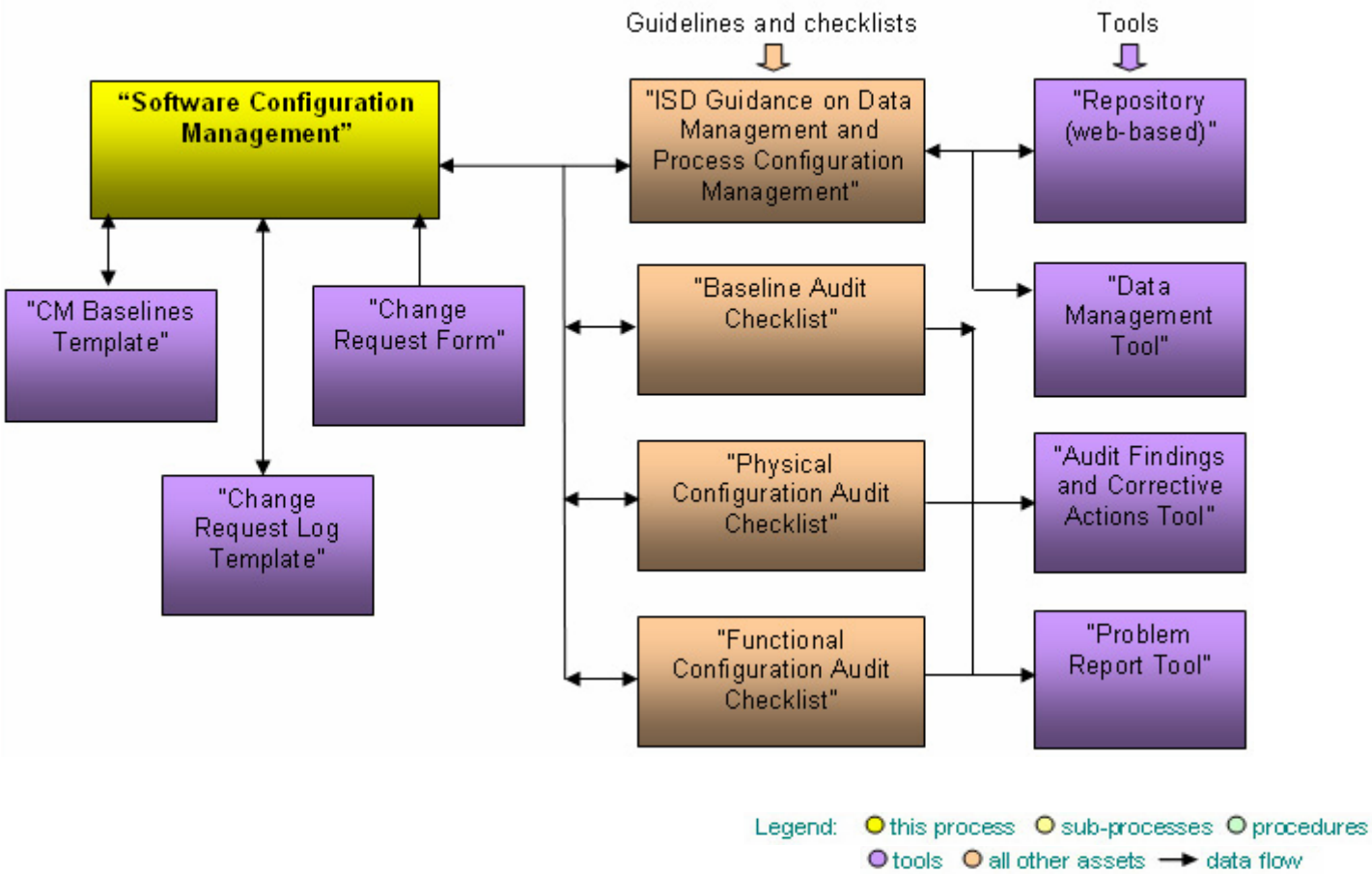
Tasks performed sequentially during planning and startup



Tasks performed sequentially and iteratively



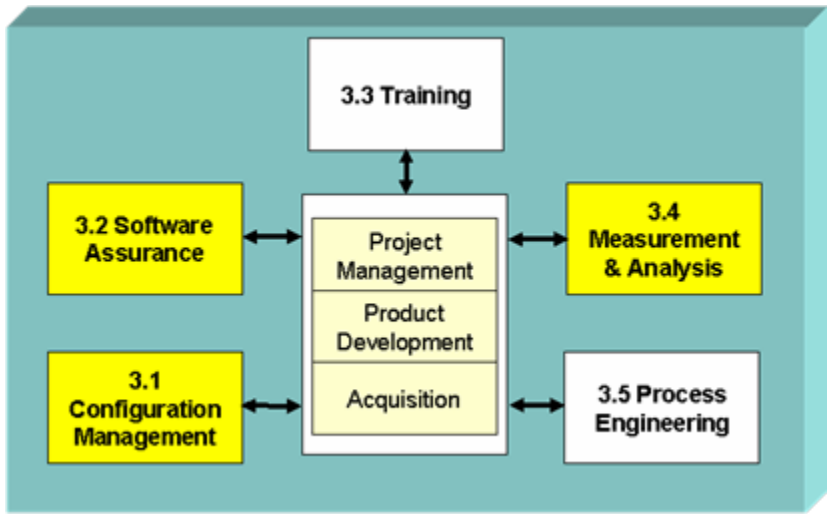
Configuration Management – Related Assets



Organizational Support - Software Assurance Process

Helps you ensure that software life cycle processes and products conform to requirements, standards, and procedures.

- Software Assurance begins during mission formulation
- The Office of Systems Safety and Mission Assurance (OSSMA), Code 300, nominally supports Class B and Class C software
- Software Quality (SQ) support is responsible for *objective evaluation of adherence* to all Process and Product Quality Assurance (PPQA) requirements
- Software Assurance is also supported by the Independent Verification and Validation Facility (IV&V)
- Software projects work in concert with these organizations



Objective evaluation that assures that a project's processes and products are in conformance with organization standards

Software Quality Tasks – Code 300

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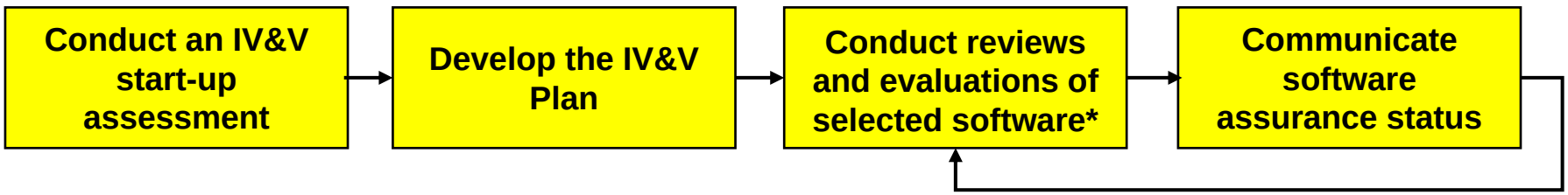
Software Quality support – sequential and iterative

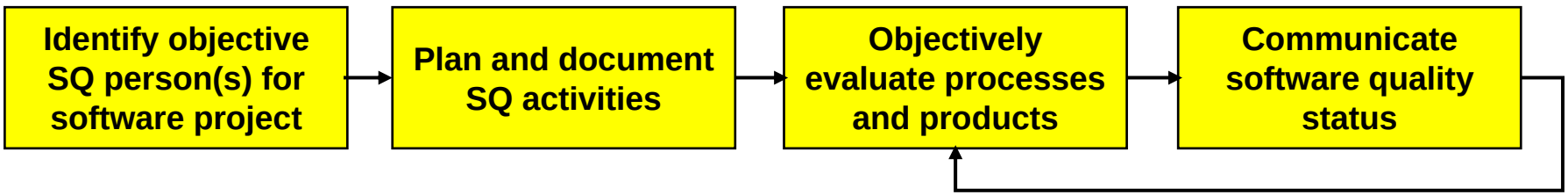
IV&V support (if funded) – sequential and iterative



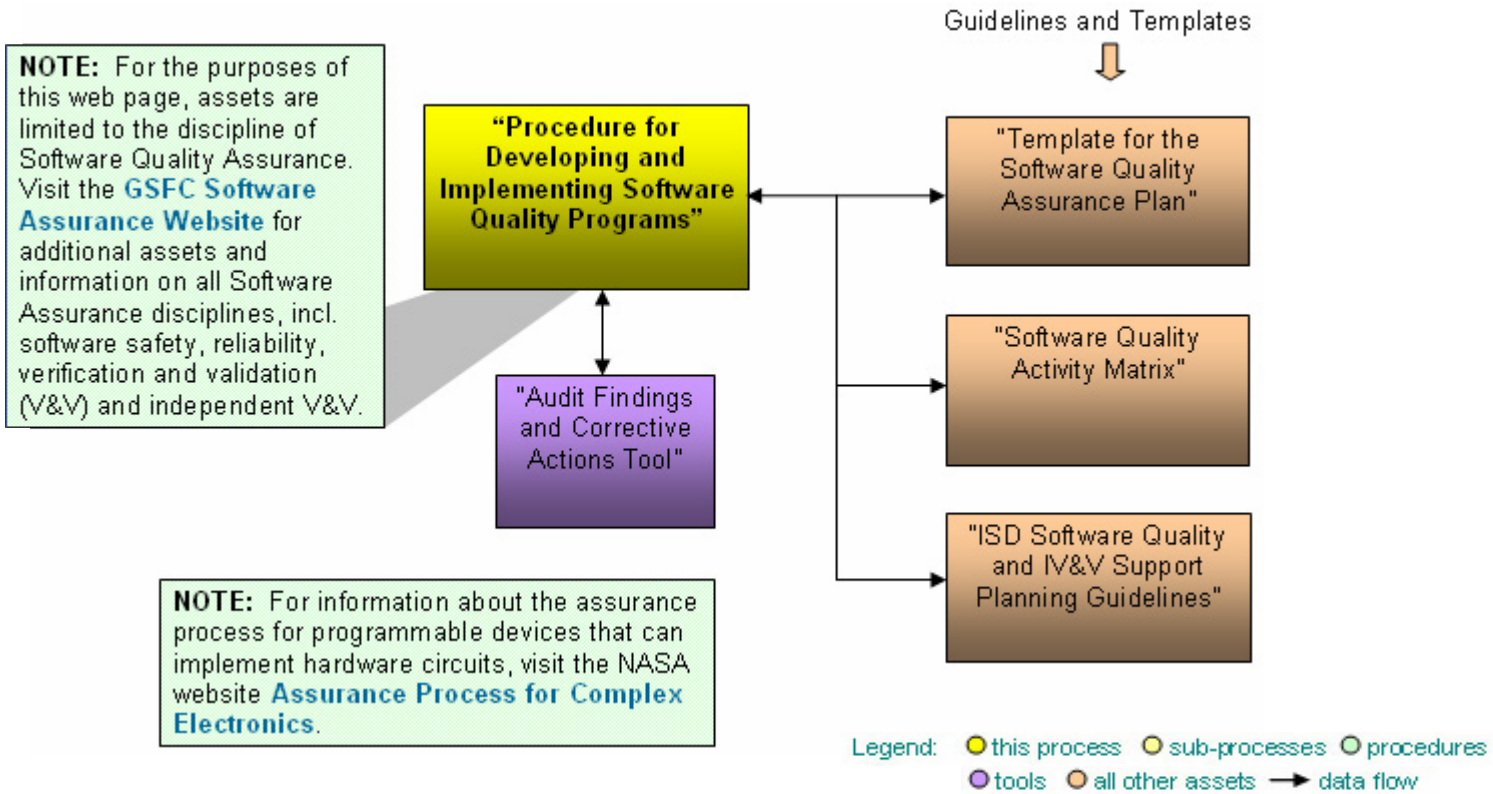
Software selected and IV&V funded by Headquarters

If Not Supported By Code 300 …

Tasks performed sequentially and iteratively



Software Assurance – Related Assets and Tools



Software Assurance – Other Related Code 300 Assets and Tools

- **Other Code 300 Assets:**
  - **Code 300 Software Quality Processes**

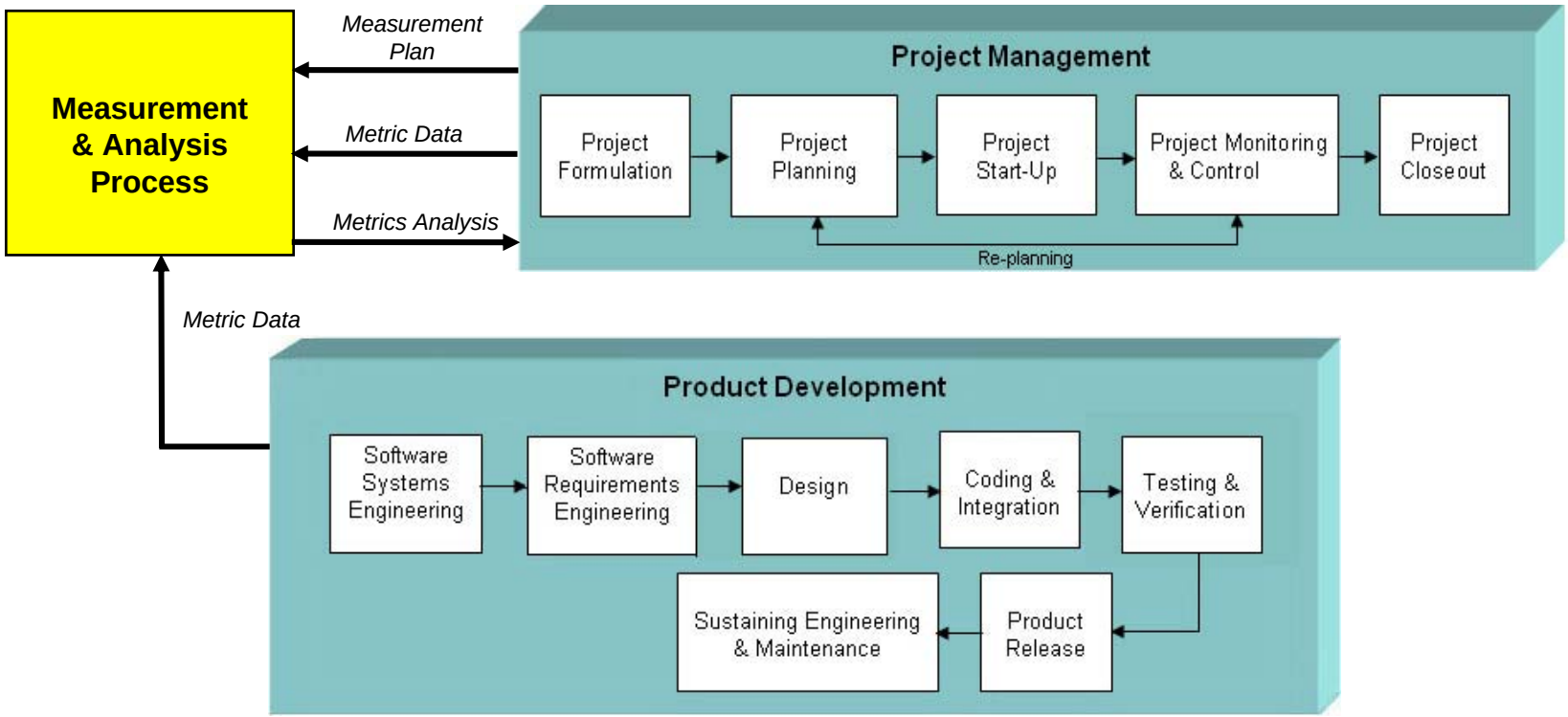
    http://sw-assurance.gsfc.nasa.gov/disciplines/quality/index.php
  - **Product Checklists**

    http://sw-assurance.gsfc.nasa.gov/disciplines/quality/index.php
  - **Software Quality Engineering Repository Database (SQERD) (*ID required for log-in*)**

    https://sqerd.gsfc.nasa.gov/

Organizational Support - Measurement and Analysis Process

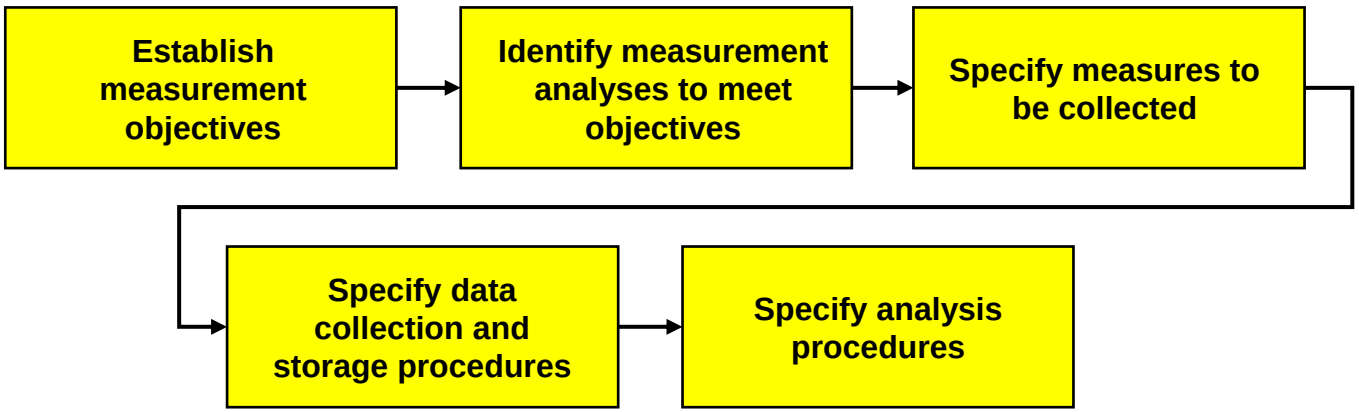
Helps collection and analysis of metric data to support project management and process improvement.



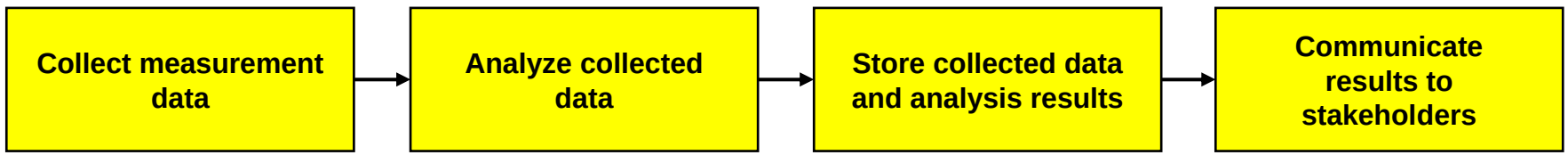
Collection and analysis of project data in support of project management and organizational improvement

Measurement and Analysis Tasks

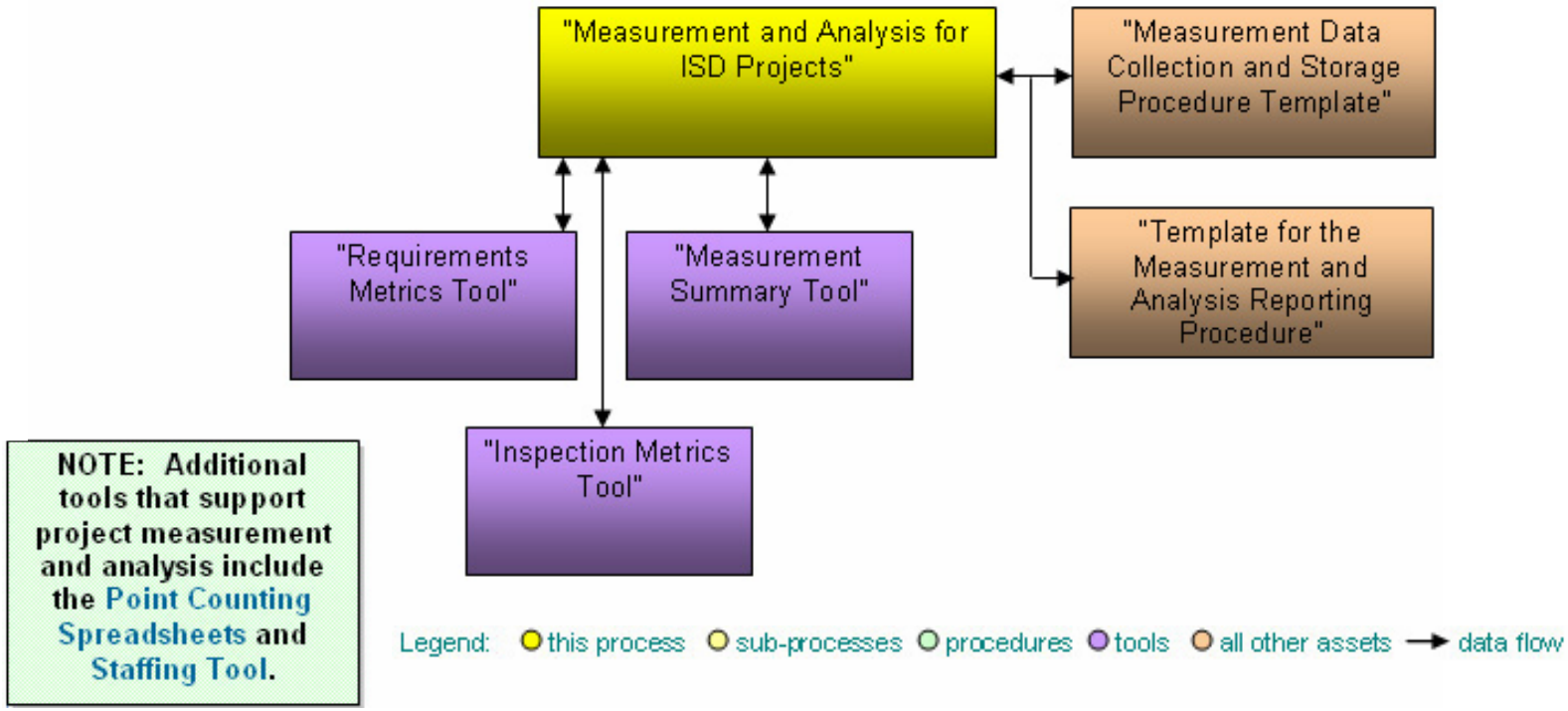
Tasks performed sequentially during planning



Tasks performed sequentially and iteratively



Measurement and Analysis – Related Assets

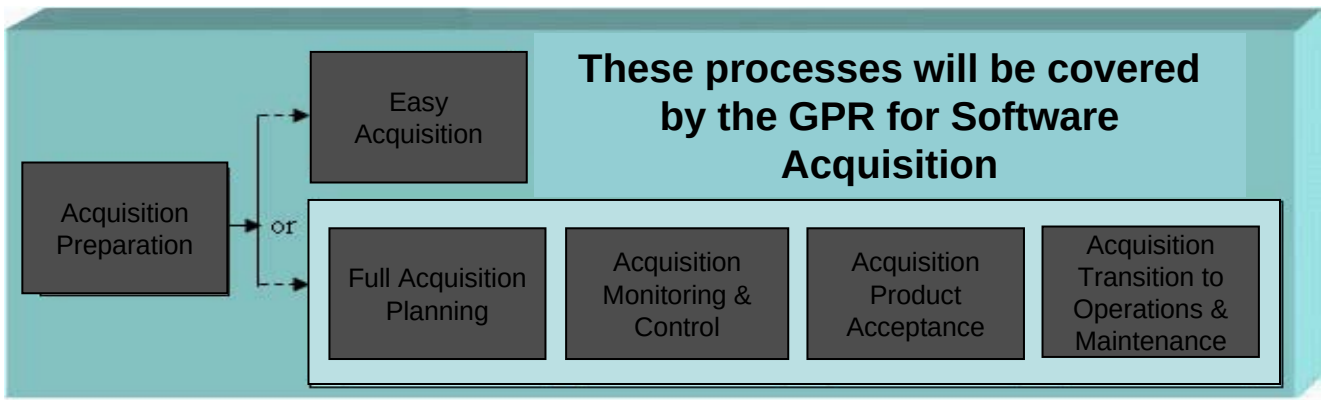


Measurement and Analysis – Other Related Assets

- **Processes and Sub-processes**
  - **ISD Measurement Plan *(from Measures tab at http://software.gsfc.nasa.gov/metrics.htm)***
- **Standards, Procedures, Guidelines, Templates, and Checklists *(from Process Asset Library tab)***
  - **ISD Branch Status Review Template (1.4.3.4)**
  - **Software Management Plan/Product Plan Boilerplate Tool, measurement section (1.2.6.2)**
  - **FSW Status Reporting Templates (1.4.3.2.1, 1.4.3.2.2, 1.4.3.2.3)**

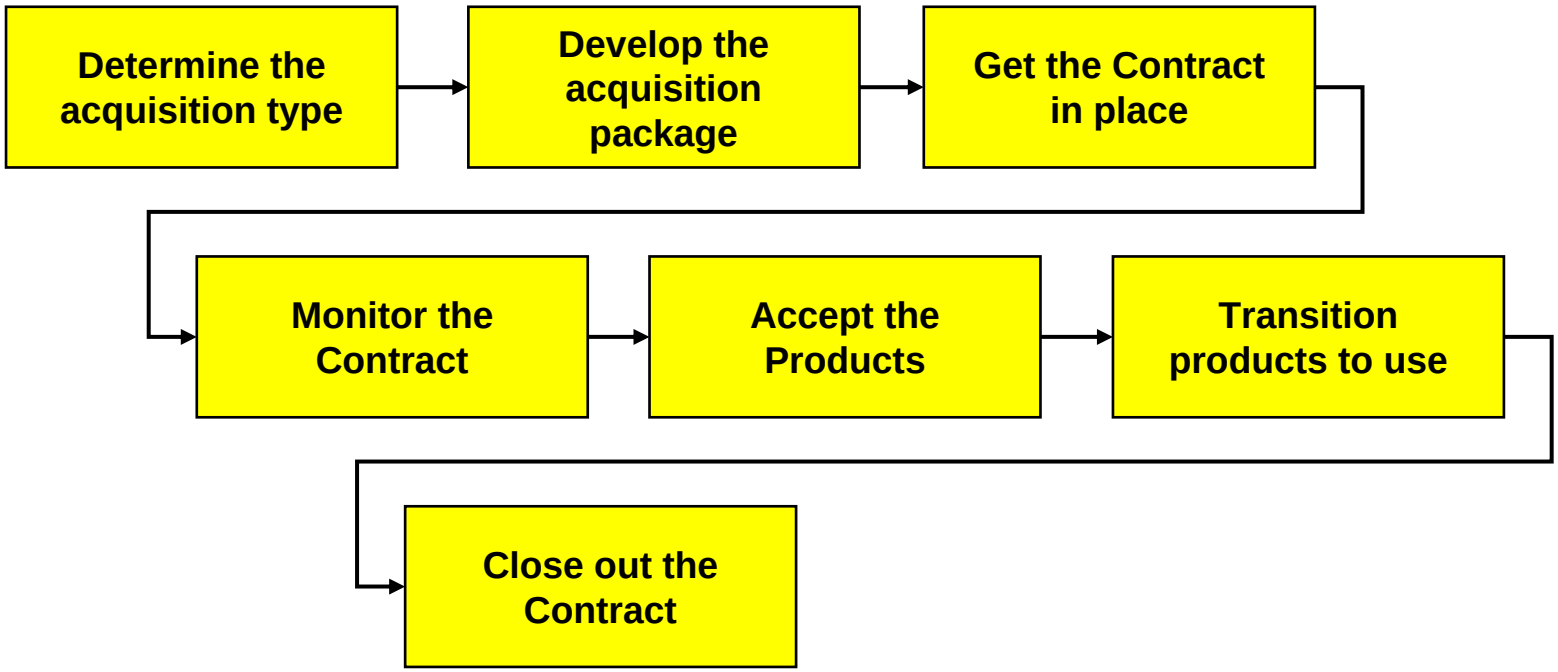
Acquisition Process

- **The acquisition process is being defined in a new GPR to be released soon**
  - **The Acquisition diagram currently in the Process Asset Library will be replaced**
  - **The Acquisition processes currently in the Process Asset Library are not organized like the GPR but contain useful details about what needs to be done during acquisition**
- **It applies to projects procuring classes A, B, C, D, and E software, services, and related items**



Acquisition Process Tasks

- Perform a make/buy decision,
- Identify the need to buy something,
- Then …



Acquisition Type

- **Acquisition type includes both acquisition method and contract vehicle**
  - **Acquisition method:**
    - Easy Acquisition
    - Full Acquisition
  - **Contract Vehicle:**
    - Purchase Order
    - Credit Card Purchase
    - Task Order
    - New Contract
    - Modification to existing contract

Acquisition Method

- **Easy Acquisition** – generally up to $100,000 but can go up to $5,000,000 for OTS hardware and software
  - Easy Acquisition for custom software or services may be competitive or sole source
  - Micro purchases have a value of up $2500, usually done with an authorized government credit card (does not require competitive bids)
- **Full Acquisition** – for acquisition of custom software, services, OTS products, and supplies needed by a software development project that exceed Easy Acquisition limits

	Value of Acquisition			
Acquisition Method	$0 - $2500	$0 - $100,000	$100,000 - $5,000,000	Over $5,000,000
Easy Acquisition COTS	Can Be Used	Can Be Used	Can Be Used	Can NOT Be Used
Easy Acquisition Custom S/W, Services	Can Be Used	Can Be Used	Can NOT Be Used	Can NOT Be Used
Full Acquisition	Can Be Used	Can Be Used	Can Be Used	Can Be Used

Acquisition – Related Assets

- **Handbook on credit card purchases**

  http://code210.gsfc.nasa.gov/hqproc/HQPCardHandbook.doc
- **P-Card log file (url is in the handbook)**

			Job Order Number:								
Item Number	Call Number	Purchase Date	Vendor Name/Address	Item Description	Quantity	Price Each	Total Price	Shipping Costs	Received Date	Tag # for ADP	Certification Date(ADP)
1							$0				
2							$0				
3							$0				
4							$0				
5							$0				

- **Acquisition Preparation Process – provides additional detail on the steps needed to make the acquisition decision and prepare to acquire a product or service**

  http://software.gsfc.nasa.gov/AssetsApproved/PA4.1.doc
- **Easy Acquisition Process – provides additional detail on the smaller acquisitions**

  http://software.gsfc.nasa.gov/AssetsApproved/PA4.1.1.doc

Summary

Summary

- **Use the Process Asset Library (PAL) at**

  http://software.gsfc.nasa.gov/

- **Talk the SPI Group if you need assistance or want to tailor the processes**
  - **Sally Godfrey – Software Process Improvement Manager**

    Sara.H.Godfrey.1@gsfc.nasa.gov
  - **Sue Sekira – Software Process Improvement**

    Susan.J.Sekira@nasa.gov

Questions

Acronyms

- CCB – Configuration Control Board
- CM – Configuration Management
- COTS – Commercial Off-the-Shelf
- DM – Data management
- FSW – Flight Software
- GPR – Goddard Procedural Requirements
- ISD – Information System Division
- IV&V – Independent Verification and Validation
- M&A – Measurement and Analysis
- OSSMA – Office of Systems Safety and Mission Assurance
- OTS – Off-the-Shelf
- PAL – Process Asset Library
- PPQA – Process and Product Quality Assurance
- SPI – Software Process Improvement
- SQ – Software Quality
- SQERD – Software Quality Engineering Repository Database
- WBS – Work Breakdown Structure